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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/549,771

09/19/2005

Osamu Funahashi

MAT-8742US

7878

52473

7590

05/01/2008

RATNERPRESTIA

P.O. BOX 980

VALLEY FORGE, PA 19482

EXAMINER

ELBIN, JESSE A

ART UNIT

PAPER NUMBER

2615

MAIL DATE

DELIVERY MODE

05/01/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/549,771	Applicant(s) FUNAHASHI, OSAMU	
	Examiner JESSE A. ELBIN	Art Unit 2615	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 September 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 September 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>19 September 2005</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings

1. Figure 5 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-7 are rejected under 35 U.S.C. 102(b) as being anticipated by Funahashi et al. (US PGPub 2003/0185415 A1).

Regarding claim 1, Funahashi teaches a loudspeaker (abstract) comprising: a magnetic circuit (#9) having an annular magnetic gap (#14); a frame (#19) coupled to the magnetic circuit (#9 and Fig. 1); a voice coil (#16) movably fitted into the magnetic

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gap ([0040] lines 1-2); and a diaphragm (#17) coupled to the frame (#19 and Fig. 1) at its periphery via a first edge (#18), wherein a suspension holder (#20) extending downward from a middle portion between an inner periphery and an outer periphery on a rear surface of the diaphragm (Figs. 7-9) is coupled to the diaphragm using an adhesive (integrated with the diaphragm; Figs 7 and [0053] lines 11-14); and the periphery of the suspension holder (#20) is coupled to the frame (#19) via a second edge (#21) that is symmetric and similar to the first edge (#18 and [0045] lines 3-5).

Regarding claim 2, Funahashi remains as applied above.

Funahashi further teaches the diaphragm (#17) is formed of resin ([0043] lines 3-4).

Regarding claim 3, Funahashi remains as applied above.

Funahashi further teaches the first edge (Fig. 12 #29) and the second edge (Fig. 12 #30) are formed in a semicircular roll shape (Figs. 1, 4-17, and 20-21), respectively, and the first edge (Fig. 12 #29) is protruded toward a magnetic circuit (the roll of the first edge extends downward; Fig. 12 and [0060] line 7) and the second edge (Fig. 12 #30) is protruded toward the diaphragm (roll of the second edge extends upward; Fig. 12 and [0060] lines 7-9).

Regarding claim 4, Funahashi remains as applied above.

Funahashi further teaches the first edge (Fig. 11 #18) and the second edge (Fig. 11 #21) are formed in a semicircular roll shape (Figs. 1, 4-17, and 20-21), respectively, and the first edge (Fig. 11 #18) is protruded toward an opposite side of the magnetic circuit (the roll of the first edge extends upward; Fig. 11 and [0058] lines 7-8) and the second edge (Fig. 11 #21) is protruded toward the magnetic circuit (the roll of the second edge extends downward; Fig. 11 and [0058] lines 7-9).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 5-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Funahashi et al. (US PGPub 2003/0185415 A1 ('415)) as applied to claim 1 above, and further in view of Albinger (US Patent 4,029,911 ('911)).

Regarding claim 5, Funahashi remains as applied above.

Funahashi does not teach an engaging portion for positioning a coupling portion in which the diaphragm and the suspension holder are integrated with each other.

In the same field of endeavor, Albinger teaches an engaging portion ('911 Fig. 2 at the area marked by #13), for positioning a coupling portion ('911 Fig. 2 at #47) in

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which the diaphragm ('911 #14) and the centering ring (suspension holder; '911 #15), are integrated with each other ('911 Fig. 2) for the benefit of ensuring a repeatable and secure fit between the diaphragm and centering ring.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the connection between the diaphragm and suspension as taught by Funahashi with the engaging and coupling portions as taught by Albinger for the benefit of ensuring a repeatable and secure fit between the diaphragm and centering ring.

Regarding claim 6, Funahashi teaches a loudspeaker ('415 abstract)

comprising: a magnetic circuit ('415 #9) having an annular magnetic gap ('415 #14); a frame ('415 #19) coupled to the magnetic circuit ('415 #9 and Fig. 1); a voice coil ('415 #16) movably fitted into the magnetic gap ('415 [0040] lines 1-2); and a diaphragm ('415 #17) coupled to the frame ('415 #19 and Fig. 1) at its periphery via a first edge ('415 #18), wherein a suspension holder ('415 #20) extending downward from a middle portion between an inner periphery and an outer periphery on a rear surface of the diaphragm ('415 Figs. 7-9) is coupled to the diaphragm using an adhesive (integrated with the diaphragm; Figs 7 and [0053] lines 11-14); and the periphery of the suspension holder ('415 #20) is coupled to the frame ('415 #19) via a second edge ('415 #21) that is symmetric and similar to the first edge ('415 #18 and [0045] lines 3-5)

Funahashi does not explicitly teach the method comprising the steps of: molding the diaphragm and the suspension holder, separately; and coupling the molded diaphragm and the molded suspension holder so as to be integrated with each other.

In the same field of endeavor, Albinger teaches the method comprising the steps of: molding the diaphragm ('911 #14) and the centering ring (suspension holder; '911 #15), separately ('911 Fig. 2 illustrates separate components); and connecting (coupling) the molded diaphragm ('911 #14) and the molded centering ring (suspension holder; '911 #15) so as to be integrated with each other ('911 col. 6 lines 45-49) for the benefit of reducing cost and complexity of molding equipment.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the steps of molding a diaphragm and suspension holder out of resin as taught by Funahashi by molding the parts separately and joining them at assembly as taught by Albinger for the benefit of reducing cost and complexity of molding equipment.

Regarding claim 7, Funahashi and Albinger remain as applied above.

Albinger further teaches using ultrasonic welding to join the diaphragm edge to a plastic part of the frame (the resin-molded diaphragm and the resin-molded suspension holder are integrated with each other by welding; '911 col. 1 lines 42-45) for the benefit of producing a uniform, reliable, and rapid attachment ('911 col. 1 lines 45-46).

While Albinger does not explicitly teach connecting the centering ring with the diaphragm by welding, Albinger teaching use of ultrasonic welding to produce a uniform, reliable, and rapid attachment between plastic parts would have made it obvious to one of ordinary skill in the art at the time of the invention to use as the method of connecting

the diaphragm and suspension holder as taught by the combination of Funahashi and Albinger.

Double Patenting

6. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the “right to exclude” granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

7. **Claims 1-7** are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 4, and 8 of U.S. Patent No. 7,324,659 in view of Funahashi et al. (US PGPub 2003/0185415 A1) and Albinger (US Patent 4,029,911 ('911)).

Instant Application	Patent 7,324,659
Claim 1 A loudspeaker comprising: a magnetic circuit having an annular magnetic gap; a frame coupled to the magnetic circuit; a voice coil movably fitted into the magnetic gap; and a diaphragm coupled to the frame at its periphery via a first edge, wherein a suspension holder extending downward from a middle portion between an inner periphery and an outer periphery on a rear surface of the diaphragm is	Claim 1 A speaker comprising: a magnetic circuit provided with a magnetic gap; a frame serving an exterior enclosure, and retaining therein the magnetic circuit; a bobbin having a voice coil, the voice coil disposed in the magnetic gap; a first surround connecting the outer perimeter of the diaphragm to the frame; Claim 8, dependent upon claim 1 the inner rim of the suspension holder is bonded to a mid area of the diaphragm.

Instant Application	Patent 7,324,659
integrated with the diaphragm;	
and the periphery of the suspension holder is coupled to the frame via a second edge	Claim 1 a suspension holder having an inner rim and an outer rim, the inner rim supporting the diaphragm, and the outer rim connected to the frame through the second surround;
that is symmetric and similar to the first edge.	Claim 4, dependent upon claim 1 the first surround and the second surround are substantially similar in shape and arranged symmetrically with respect to each other.

Patent 7,324,659 does not explicitly claim the voice coil being movably fitted, the suspension holder extending downward from the diaphragm, nor does it claim the suspension holder connected to a rear surface of the diaphragm.

Funahashi teaches the voice coil member having a movable coil (being moveably fitted; [0042] lines 1-2), the suspension holder (Figs. 7-8 #25 and Fig. 9 #27) extending downward from the diaphragm (Figs. 7-9), and the suspension holder connected to a rear surface of the diaphragm (Figs. 7-9) for the benefit of making the suspension holder lighter so that sound conversion efficiency is improved ([0055] lines 12-14).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the loudspeaker as claimed in the instant application with the

suspension as taught by Funahashi for the benefit of making the suspension holder lighter so that sound conversion efficiency is improved.

Regarding claims 2-7, Funahashi and Albinger teaches all the claimed limitations (see art rejections of claims 2-7 above).

8. **Claims 1-2 and 5-7** are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 1 of U.S. Patent No. 7,209,570 in view of Albinger (US Patent 4,029,911 ('911)).

Instant Application	Patent 7,209,570
Claim 1 A loudspeaker comprising: a magnetic circuit having an annular magnetic gap; a frame coupled to the magnetic circuit; a voice coil movably fitted into the magnetic gap; and a diaphragm coupled to the frame at its periphery via a first edge, wherein a suspension holder extending downward from a middle portion between an inner periphery and an outer periphery on a rear surface of the diaphragm is integrated with the	Claim 1 A loudspeaker comprising: a magnetic circuit including a magnetic gap; a voice coil member disposed in said magnetic gap and having a movable coil; a first edge having an inner end connected to an outer peripheral part of said diaphragm, and an outer end connected to said frame,

Instant Application	Patent 7,209,570
<p>diaphragm;</p> <p>and the periphery of the suspension holder is coupled to the frame via a second edge that is symmetric and similar to the first edge.</p>	<p>an outer peripheral part of said suspension holder is connected to said frame via a second edge, with said first edge and said second edge being substantially symmetrical relative to one another about a median of said first edge and said second edge.</p>
<p>Claim 6</p> <p>A method for manufacturing a loudspeaker comprising:</p> <p>a magnetic circuit having an annular magnetic gap;</p> <p>a frame coupled to the magnetic circuit;</p> <p>a voice coil movably fitted into the magnetic gap;</p> <p>and a diaphragm coupled to the frame at its periphery via a first edge,</p> <p>wherein a suspension holder extending downward from a middle portion between an inner periphery and an outer periphery on a rear surface of the</p>	<p>Claim 1</p> <p>A loudspeaker comprising:</p> <p>a magnetic circuit including a magnetic gap;</p> <p>a voice coil member disposed in said magnetic gap and having a movable coil;</p> <p>a first edge having an inner end connected to an outer peripheral part of said diaphragm, and an outer end connected to said frame,</p>

Instant Application	Patent 7,209,570
<p>diaphragm is integrated with the diaphragm;</p> <p>and the periphery of the suspension holder is coupled to the frame via a second edge that is symmetric and similar to the first edge,</p> <p>The method comprising the steps of: molding the diaphragm and the suspension holder with resin, separately; and coupling the molded diaphragm and the molded suspension holder so as to be integrated with each other.</p>	<p>an outer peripheral part of said suspension holder is connected to said frame via a second edge, with said first edge and said second edge being substantially symmetrical relative to one another about a median of said first edge and said second edge.</p>

Patent 7,209,570 does not explicitly claim a frame being coupled to the magnetic circuit, nor does it claim a suspension holder, extending downward from a middle portion between an inner periphery and an outer periphery on a rear surface of the diaphragm, is integrated with the diaphragm.

Regarding claim 1, Albinger teaches a frame (#1) being coupled to the magnetic system (circuit; #2), and a centering ring (suspension holder; #15), extending downward from a middle portion between an inner periphery and an outer periphery on a rear

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surface of the diaphragm, is integrated with the diaphragm (Figs. 1-2) for the benefit of providing voice coil centering.

it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the loudspeaker as claimed in the instant application with a magnetic circuit coupled to the frame and the suspension structure as taught by Albinger for the benefit of providing voice coil centering.

Regarding claim 2, Albinger teaches ultrasonic welding between a plastic contact surface and the edge of the diaphragm (the diaphragm is formed of resin; '911 col. 1 lines 42-45)

While Albinger does not explicitly teach the diaphragm being made of resin, it would have been obvious to one of ordinary skill in the art at the time of the invention to make the diaphragm out of plastic as would be required for ultrasonic welding to be performed between the edge and a plastic contact surface as taught by Albinger.

Regarding claim 5, Albinger teaches an engaging portion ('911 Fig. 2 at the area marked by #13), for positioning a coupling portion ('911 Fig. 2 at #47) in which the diaphragm ('911 #14) and the centering ring (suspension holder; '911 #15), are integrated with each other ('911 Fig. 2) for the benefit of ensuring a repeatable and secure fit between the diaphragm and centering ring.

Regarding claim 6, see rejection of claim 1 above. Further Albinger teaches the method comprising the steps of: molding the diaphragm ('911 #14) and the centering ring (suspension holder; '911 #15), separately ('911 Fig. 2 illustrates separate components); and connecting (coupling) the molded diaphragm ('911 #14) and the

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molded centering ring (suspension holder; '911 #15) so as to be integrated with each other ('911 col. 6 lines 45-49) for the benefit of reducing cost and complexity of molding equipment.

Regarding claim 7, Albinger further teaches using ultrasonic welding to join the diaphragm edge to a plastic part of the frame (the resin-molded diaphragm and the resin-molded suspension holder are integrated with each other by welding; '911 col. 1 lines 42-45) for the benefit of producing a uniform, reliable, and rapid attachment ('911 col. 1 lines 45-46).

While Albinger does not explicitly teach connecting the centering ring with the diaphragm by welding, Albinger teaching use of ultrasonic welding to produce a uniform, reliable, and rapid attachment between plastic parts would have made it obvious to one of ordinary skill in the art at the time of the invention to use as the method of connecting the diaphragm and suspension holder as taught by the combination of Funahashi and Albinger.}

9. **Claims 1-7** are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 8-9, and 17 of U.S. Patent No. 7,203,333 in view of Funahashi et al. (US PGPub 2003/0185415 A1) and Albinger (US Patent 4,029,911 ('911)).

Instant Application	Patent 7,203,333
Claim 1 A loudspeaker comprising: a magnetic circuit having an annular	Claim 1: A speaker comprising: a magnetic circuit having a magnetic

Instant Application	Patent 7,203,333
<p>magnetic gap;</p> <p>a frame coupled to the magnetic circuit;</p> <p>a voice coil movably fitted into the magnetic gap;</p> <p>and a diaphragm coupled to the frame at its periphery via a first edge,</p> <p>wherein a suspension holder extending downward from a middle portion between an inner periphery and an outer periphery on a rear surface of the diaphragm is integrated with the diaphragm;</p> <p>and the periphery of the suspension holder is coupled to the frame via a second edge that is symmetric and similar to the first edge.</p>	<p>gap, a top surface, and a bottom surface;</p> <p>a frame supporting the diaphragm and the magnetic circuit;</p> <p>a voice coil body having a bobbin and a coil section, the coil section being movable in the magnetic gap;</p> <p>a first edge coupling an outer periphery of the diaphragm to the frame</p> <p>the diaphragm has a bent section between the outer periphery of the diaphragm and the inner periphery of the diaphragm wherein the diaphragm is coupled to the suspension holder at the bent section.</p> <p>a second edge coupling an outer periphery of the suspension holder to the frame,</p>
<p>Claim 3, dependent upon claim 1</p> <p>the first edge and the second edge are formed in a semicircular roll shape, respectively, and the roll of the first edge extends downward and the roll of the second edge extends upward.</p>	<p>Claim 9, dependent upon claim 1</p> <p>the first edge has a portion that protrudes inwardly in a first direction from the back surface of the diaphragm and the second edge has a portion that protrudes in a second direction, opposite to the</p>

Instant Application	Patent 7,203,333
	first direction.
Claim 4, dependent upon claim 1 the first edge and the second edge are formed in a semicircular roll shape, respectively , and the roll of the first edge extends upward and the roll of the second edge extends downward.	Claim 8, dependent upon claim 1 the first edge has a portion that protrudes outwardly in a first direction from the front surface of the diaphragm and the second edge has a portion that protrudes in a second direction, opposite to the first direction.
Claim 5, dependent upon claim 1 an engaging portion for positioning a coupling portion in which the diaphragm and the suspension holder are integrated with each other.	Claim 17, dependent upon claim 1 further comprising an elastic body, wherein the diaphragm is coupled to the suspension holder via the elastic body.

Patent 7,203,333 does not explicitly claim the suspension holder extending downward from the diaphragm, the second edge being symmetric and similar to the first edge, nor does it claim the first and second edges are formed in a semicircular roll shape.

{Funahashi teaches the suspension holder (Figs. 7-8 #25 and Fig. 9 #27) extending downward from the diaphragm (Figs. 7-9), and the second edge being formed in a semicircular roll shape (Figs. 1, 4-17, and 20-21) and are symmetric and similar to the first edge ([0045] lines 1-5) for the benefit of cancelling out their own asymmetry ([0048] lines 8-10).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the loudspeaker as claimed in the instant application with the suspension and symmetric edges as taught by Funahashi for the benefit of cancelling out their own asymmetry.

Regarding claims 2-7, Funahashi and Albinger teaches all the claimed limitations (see art rejections of claims 2 and 6-7 above).

10. **Claims 1-7** are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 1 of copending Application No. 10/583044 in view of Funahashi et al. (US PGPub 2003/0185415 A1) and Albinger (US Patent 4,029,911 ('911)).

This is a provisional obviousness-type double patenting rejection.

Instant Application	Application 10/583,044 (PGPub 2007/0177757)
Claim 1 A loudspeaker comprising: a magnetic circuit having an annular magnetic gap; a frame coupled to the magnetic circuit; a voice coil movably fitted into the magnetic gap; and a diaphragm coupled to the frame at its periphery via a first edge,	Claim 1 A loudspeaker comprising a magnetic circuit held by the frame, a voice coil body disposed so as it can move freely in a magnetic gap of the magnetic circuit, a diaphragm whose outer circumferential end is connected to the frame via a first edge,

Instant Application	Application 10/583,044 (PGPub 2007/0177757)
wherein a suspension holder extending downward from a middle portion between an inner periphery and an outer periphery on a rear surface of the diaphragm is integrated with the diaphragm; and the periphery of the suspension holder is coupled to the frame via a second edge that is symmetric and similar to the first edge.	a suspension holder whose outer circumferential end is connected to the frame via a second edge;

PGPub 2007/0177757 does not explicitly claim a suspension holder, extending downward from a middle portion between an inner periphery and an outer periphery on a rear surface of the diaphragm, is integrated with the diaphragm, nor does it claim the second edge being symmetric and similar to the first edge.

Funahashi teaches a suspension holder (Figs. 7-8 #25 and Fig. 9 #27), extending downward from a middle portion between an inner periphery and an outer periphery on a rear surface of the diaphragm, is integrated with the diaphragm (Figs. 7-9), and the second edge being symmetric and similar to the first edge ([0045] lines 1-5) for the benefit of cancelling out their own asymmetry ([0048] lines 8-10).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the loudspeaker as claimed in the instant application with the suspension and symmetric edges as taught by Funahashi for the benefit of cancelling out their own asymmetry.

Regarding claims 2-7, Funahashi and Albinger teaches all the claimed limitations (see art rejections of claims 2-7 above).

11. **Claims 1-7** are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1 and 9 of copending Application No. 10/585,942 in view of Funahashi et al. (US PGPub 2003/0185415 A1) and Albinger (US Patent 4,029,911 ('911)).

This is a provisional obviousness-type double patenting rejection.

Instant Application	Application 10/585,942 (PGPub 2007/0121995)
Claim 1 A loudspeaker comprising: a magnetic circuit having an annular magnetic gap; a frame coupled to the magnetic circuit; a voice coil movably fitted into the magnetic gap; and a diaphragm coupled to the frame at its periphery via a first edge, wherein a suspension holder extending downward from a middle portion between an inner	Claim 1 A speaker, comprising: a magnetic circuit having a magnetic gap and disposed inside of the frame; a voice coil body disposed movably in the magnetic gap; and a diaphragm whose outer periphery edge is coupled to the frame, Claim 9, dependent upon claim 1 a suspension-holder whose an end is coupled to the frame and other end is coupled to a back surface of the

Instant Application	Application 10/585,942 (PGPub 2007/0121995)
periphery and an outer periphery on a rear surface of the diaphragm is integrated with the diaphragm; and the periphery of the suspension holder is coupled to the frame via a second edge that is symmetric and similar to the first edge.	diaphragm.

PGPub 2007/0121995 does not explicitly claim the suspension holder, extending downward from a middle portion between an inner periphery and an outer periphery of the diaphragm, nor does it claim the periphery of the suspension holder is coupled via a second edge that is symmetric and similar to the first edge.

Funahashi teaches a suspension holder (Figs. 7-8 #25 and Fig. 9 #27), extending downward from a middle portion between an inner periphery and an outer periphery (Figs. 7-9), and the periphery of the suspension holder is coupled via a second edge (Figs. 7-9 #21) that is symmetric and similar to the first edge ([0045] lines 1-5) for the benefit of cancelling out their own asymmetry ([0048] lines 8-10).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the loudspeaker as claimed in the instant application with the suspension and symmetric edges as taught by Funahashi for the benefit of cancelling out their own asymmetry.

Regarding claims 2-7, Funahashi and Albinger teaches all the claimed limitations (see art rejections of claims 2 -7 above).

12. **Claims 1-7** are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1 and 2 of copending Application No. 10/568,278 in view of Funahashi et al. (US PGPub 2003/0185415 A1) and Albinger (US Patent 4,029,911 ('911)).

This is a provisional obviousness-type double patenting rejection.

Instant Application	Application 10/568,278 (PGPub 2006/0285718)
<p>Claim 1 A loudspeaker comprising: a magnetic circuit having an annular magnetic gap; a voice coil movably fitted into the magnetic gap;</p> <p>a frame coupled to the magnetic circuit;</p> <p>and a diaphragm coupled to the frame at its periphery via a first edge,</p>	<p>Claim 1 A speaker including: a magnetic circuit wherein at least a part of the voice coil is movably disposed in a magnetic gap of the magnetic circuit;</p> <p>Claim 2, dependent upon claim 1 the magnetic circuit includes: a ring-shaped plate outer periphery thereof being laminated on the magnet and inner periphery thereof being pushed into the frame together with the columnar protrusion of the yoke.</p> <p>Claim 1 a diaphragm with outer periphery of the diaphragm being fixed to an</p>

Instant Application	Application 10/568,278 (PGPub 2006/0285718)
<p>wherein a suspension holder extending downward from a middle portion between an inner periphery and an outer periphery on a rear surface of the diaphragm is integrated with the diaphragm;</p> <p>and the periphery of the suspension holder is coupled to the frame via a second edge that is symmetric and similar to the first edge.</p>	<p>edge of the opening of the frame through a first edge;</p> <p>and a suspension holder outer periphery thereof being fixed to the frame through a second edge on the bottom surface of the diaphragm inside the frame; wherein the first and the second edges are substantially symmetrical with respect to a space between the first and the second edges,</p>

PGPub 2006/0285718 does not claim wherein a suspension holder, extending downward from a middle portion between an inner periphery and an outer periphery on a rear surface of the diaphragm, is integrated with the diaphragm.

{Funahashi teaches a suspension holder (Figs. 7-8 #25 and Fig. 9 #27), extending downward from a middle portion between an inner periphery and an outer periphery on a rear surface of the diaphragm, is integrated with the diaphragm (Figs. 7-

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9) for the benefit of making the suspension holder lighter so that sound conversion efficiency is improved ([0055] lines 12-14).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the loudspeaker as claimed in the instant application with the suspension as taught by Funahashi for the benefit of making the suspension holder lighter so that sound conversion efficiency is improved.

Regarding claims 2-7, Funahashi and Albinger teaches all the claimed limitations (see art rejections of claims 2 -7 above).

13. **Claims 1-7** are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 1 of copending Application No. 10/549,424 in view of Funahashi et al. (US PGPub 2003/0185415 A1) and Albinger (US Patent 4,029,911 ('911)).

This is a provisional obviousness-type double patenting rejection.

Instant Application	Application 10/549,424 (PGPub 2006/0245615)
Claim 1 A loudspeaker comprising: a voice coil movably fitted into the magnetic gap; a magnetic circuit having an annular magnetic gap; a frame coupled to the magnetic circuit;	Claim 1 A loudspeaker comprising: a voice coil unit disposed slidably with respect to a magnetic gap provided in the magnetic circuit; a magnetic circuit disposed inside the frame;

Instant Application	Application 10/549,424 (PGPub 2006/0245615)
<p>and a diaphragm coupled to the frame at its periphery via a first edge,</p> <p>wherein a suspension holder extending downward from a middle portion between an inner periphery and an outer periphery on a rear surface of the diaphragm is integrated with the diaphragm;</p> <p>and the periphery of the suspension holder is coupled to the frame via a second edge that is symmetric and similar to the first edge.</p>	<p>a diaphragm coupled to the frame at its outer circumferential end part via a first edge;</p> <p>and a suspension holder coupled to a rear surface of the diaphragm and coupled to the frame at its one end via a second edge;</p>
<p>Claim 3, dependent upon claim 1</p> <p>the first edge and the second edge are formed in a semicircular roll shape, respectively, and the roll of the first edge extends downward and the roll of the second edge extends upward.</p>	<p>Claim 2, dependent upon claim 1</p> <p>the first edge is allowed to bend downward and the second edge is allowed to bend upward.</p>
<p>Claim 4, dependent upon claim 1</p> <p>the first edge and the second edge are formed in a semicircular roll shape, respectively, and the roll of the first edge extends upward and the roll of the second edge extends downward.</p>	<p>Claim 3 dependent upon claim 1</p> <p>the first edge is allowed to bend upward and the second edge is allowed to bend downward.</p>

PGPub 2006/0245615 does not explicitly claim the suspension holder extending downward from a middle portion, the first and second edges being formed in a semicircular roll shape, nor does it claim the second edge being symmetric and similar to the first edge.

{Funahashi teaches the suspension holder extending downward from the diaphragm (Figs. 7-9), and the second edge being formed in a semicircular roll shape (Figs. 1, 4-17, and 20-21) and are symmetric and similar to the first edge ([0045] lines 1-5) for the benefit of cancelling out their own asymmetry ([0048] lines 8-10).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the loudspeaker as claimed in the instant application with the suspension and symmetric edges as taught by Funahashi for the benefit of cancelling out their own asymmetry.

Regarding claims 2-7, Funahashi and Albinger teaches all the claimed limitations (see art rejections of claims 2-7 above).

14. **Claims 1-7** are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 91 of copending Application No. 11/418,143 in view of Funahashi et al. (US PGPub 2003/0185415 A1) and Albinger (US Patent 4,029,911 ('911)).

This is a provisional obviousness-type double patenting rejection.

Instant Application	Application 11/418143 (PGPub 2006/0215871)
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Instant Application	Application 11/418143 (PGPub 2006/0215871)
<p>Claim 1</p> <p>A loudspeaker comprising:</p> <p>a magnetic circuit having an annular magnetic gap;</p> <p>a frame coupled to the magnetic circuit;</p> <p>a voice coil movably fitted into the magnetic gap;</p> <p>and a diaphragm coupled to the frame at its periphery via a first edge,</p> <p>wherein a suspension holder extending downward from a middle portion between an inner periphery and an outer periphery on a rear surface of the diaphragm is integrated with the diaphragm;</p> <p>and the periphery of the suspension holder is coupled to the frame via a second edge that is symmetric and similar to the first edge.</p>	<p>Claim 114</p> <p>A loudspeaker comprising:</p> <p>a magnetic circuit including a magnetic gap;</p> <p>a voice coil member disposed in the magnetic gap of said magnetic circuit and having a movable coil;</p> <p>a frame linked with an outer peripheral part of said diaphragm via a first edge;</p> <p>wherein an inner peripheral part of a suspension holder is linked with a middle section of said diaphragm;</p> <p>wherein an outer peripheral part of said suspension holder is linked with said frame via a second edge;</p> <p>and wherein the first edge and the second edge are substantially symmetrical with each other about a median of the first edge and the second edge.</p>
<p>Claim 3, dependent upon claim 1</p>	<p>Claim 117, dependent upon claim 114</p>

Instant Application	Application 11/418143 (PGPub 2006/0215871)
the first edge and the second edge are formed in a semicircular roll shape, respectively , and the roll of the first edge extends downward and the roll of the second edge extends upward.	the first edge is protruded toward said magnetic circuit, and the second edge is protruded toward said diaphragm.
Claim 4, dependent upon claim 1 the first edge and the second edge are formed in a semicircular roll shape, respectively , and the roll of the first edge extends upward and the roll of the second edge extends downward.	Claim 116, dependent upon claim 114 the first edge is protruded toward an opposite side of said magnetic circuit, and the second edge is protruded toward said magnetic circuit.

PGPub 2006/0215871 does not explicitly claim a magnetic circuit coupled to the frame, nor does it claim the second edge being symmetric and similar to the first edge.

{Funahashi teaches a magnetic circuit (Fig. 1 #9-13) coupled to the frame (Fig. 1 #19) and the second edge being formed in a semicircular roll shape (Figs. 1, 4-17, and 20-21) and are symmetric and similar to the first edge ([0045] lines 1-5) for the benefit of providing a flexible connection for centering the voice coil.)

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the loudspeaker as claimed in the instant application with the magnetic circuit and roll shaped edges for the benefit of providing a flexible connection for centering the voice coil.

Regarding claims 2-7, Funahashi and Albinger teaches all the claimed limitations (see art rejections of claims 2-7 above).

Conclusion

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- a. Sahyoun (US PGPub 2004/0076309) teaches a speaker with centering member connected directly to the rear side of the diaphragm.
- b. Rouy (US Patent 3,125,647) teaches a centering member connected to the rear side of a diaphragm via a flange.
- c. Wank et al. (US Patent 5,056,617) teaches a diaphragm for a loudspeaker made of resin/plastic material and welding plastic components together.
- d. Suzuki et al. (US Patent 4,395,597) teaches a speaker diaphragm made of foam resin including a supporting member at the suspension-diaphragm connection.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JESSE A. ELBIN whose telephone number is (571)270-3710. The examiner can normally be reached on Monday through Friday, 8:00am to 5:00pm EDT.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sinh Tran can be reached on (571) 272-7564. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/J. A. E./
Examiner, Art Unit 2615

/Sinh N Tran/
Supervisory Patent Examiner, Art Unit 2615